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WO 88/03488 A1 US 4763381 A US 4700424 A
US 4090668 A

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UK CL (Edition L) A4F FAA FAK FAL FAMA FAMC FAMD
INT CL[5] B60R 1/06, B60S 1/48 1/50

(54) Windscreen cleaning system

(57) A screen wash system that operates without the addition of antifreeze comprises an insulated reservoir, 7 which may be heated from the coolant system of an internal combustion engine and is able to retain heat when the engine is switched off. The reservoir 7 is fed from a cold water reservoir 6 which is also insulated and may itself be independently heated. A level sensor is provided in reservoir 6. To avoid freezing in the pipes, the pump 8 is reversible so as draw water back into the insulated reservoir 7 after use of the washers.

A control arrangement for a wash/wipe system is also disclosed whereby with the wipes in intermittant mode, the wash jets are actuated in co-ordinated manner with the wipes so as to deactivate the jets just before the blades reach the target spots on the screen.

FIG 1

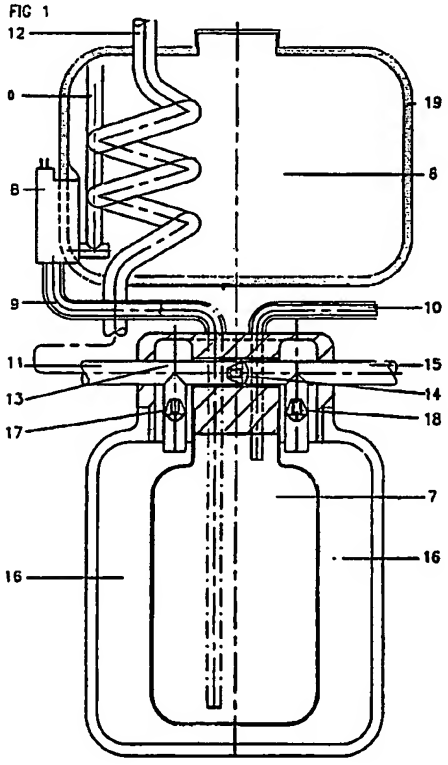

FIG 4

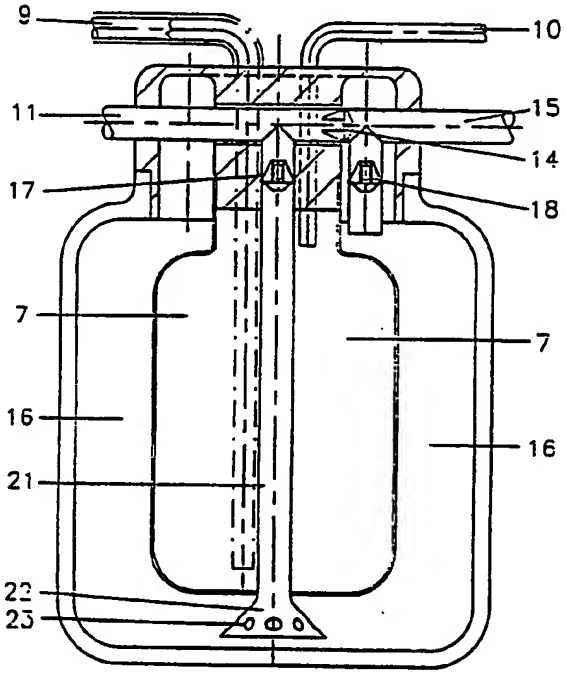

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FIG 1

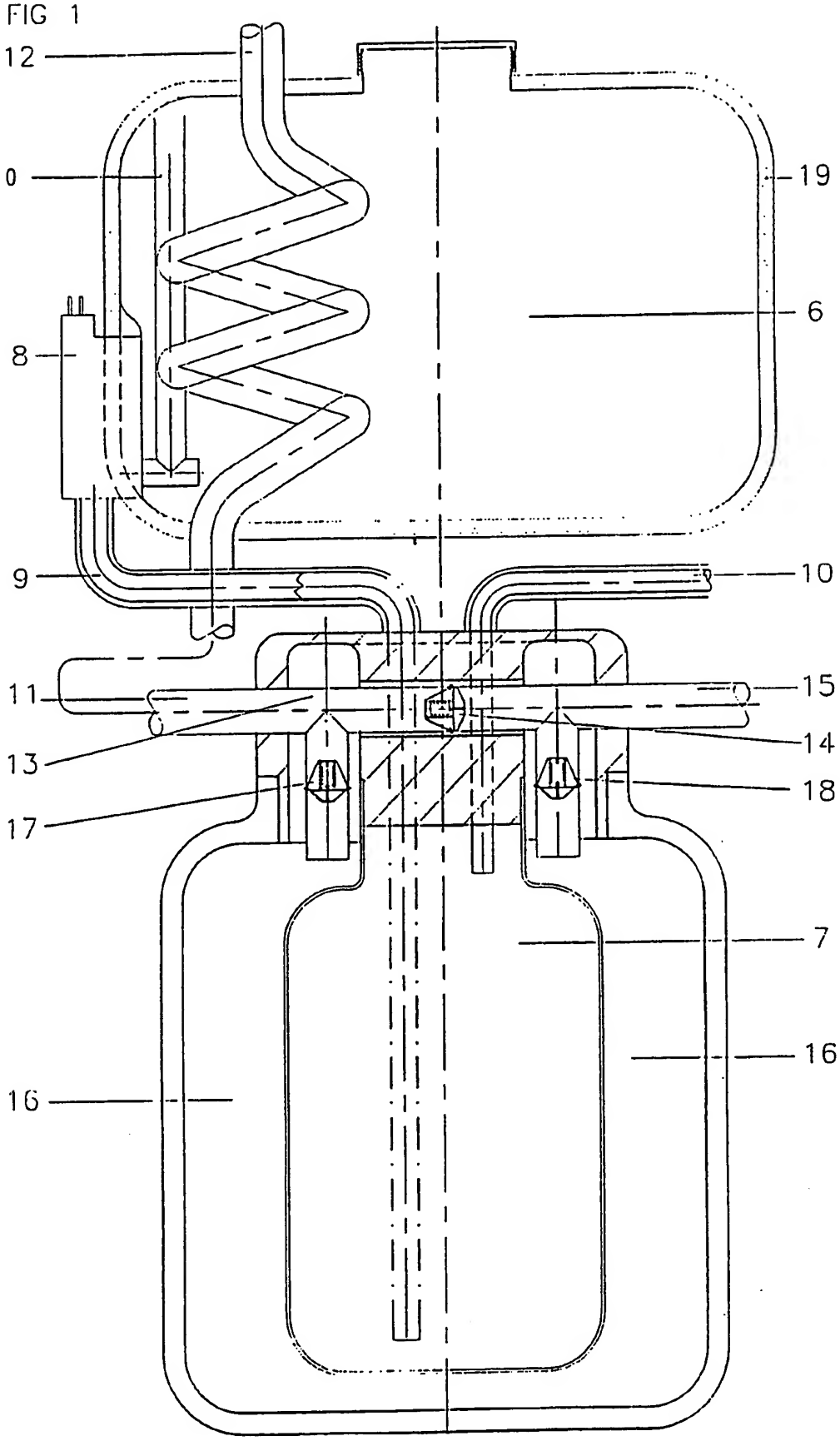


FIG 2

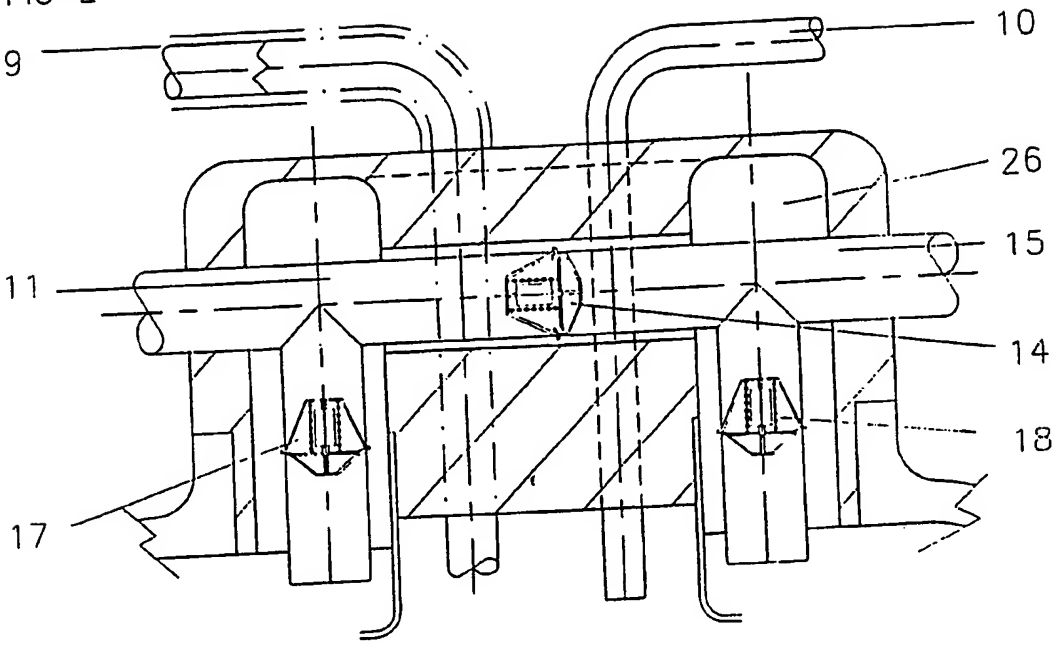
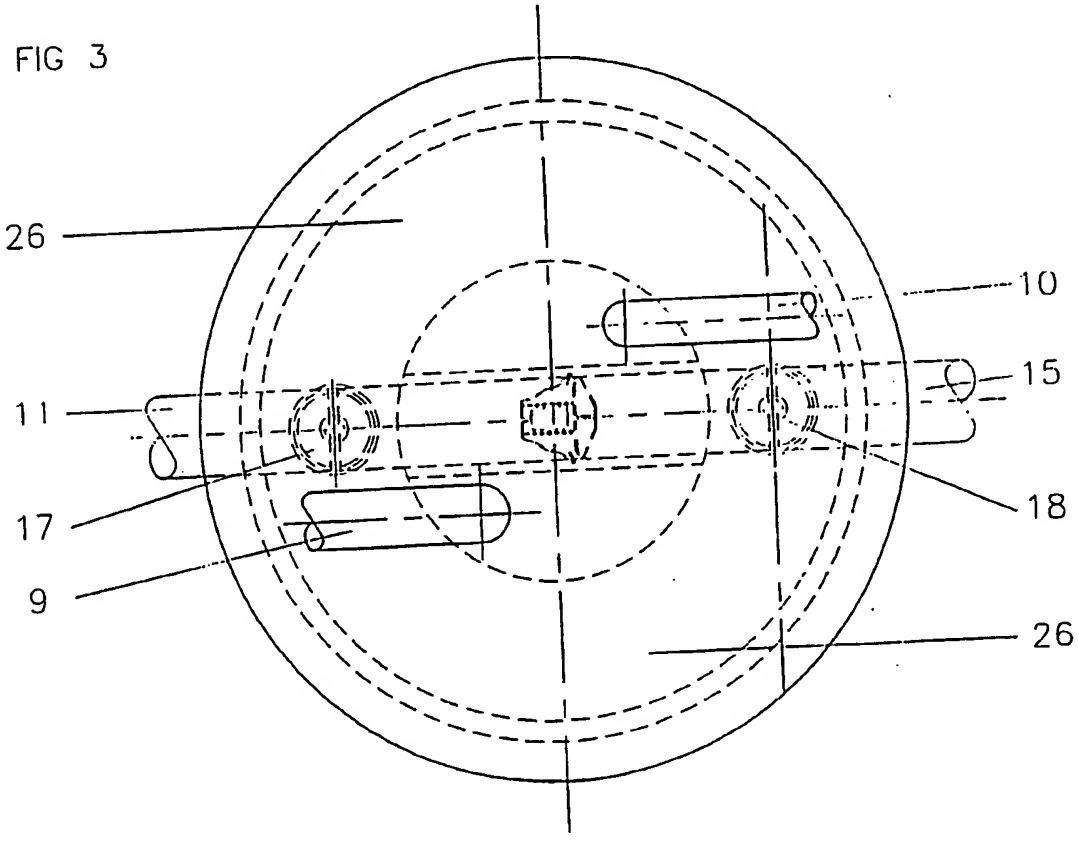


FIG 3



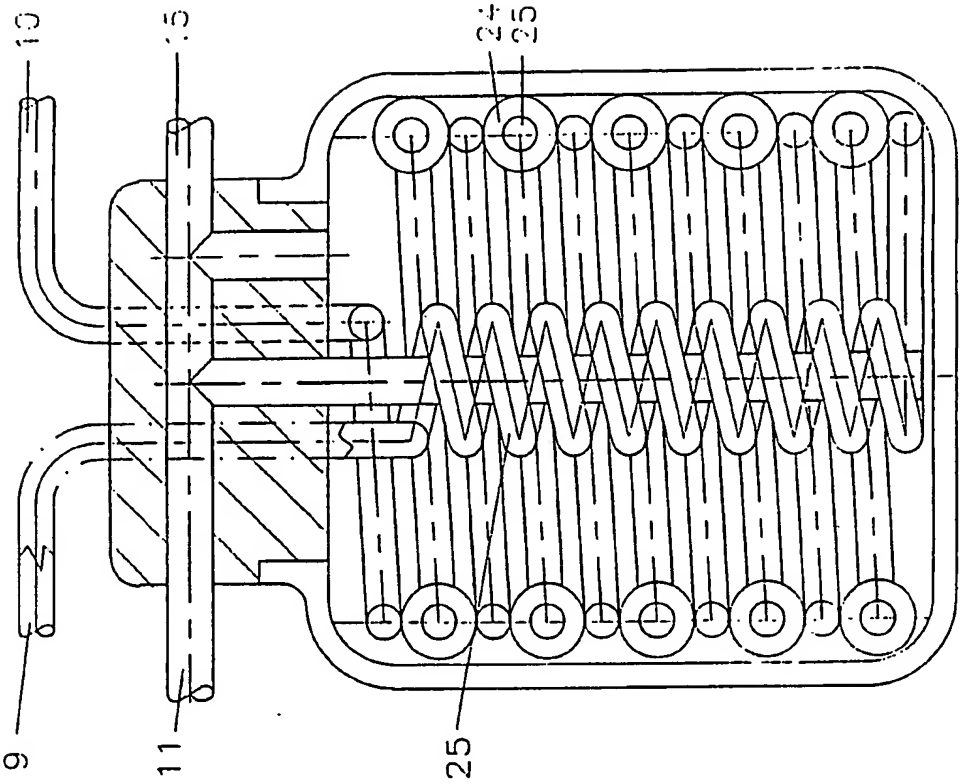


FIG 5

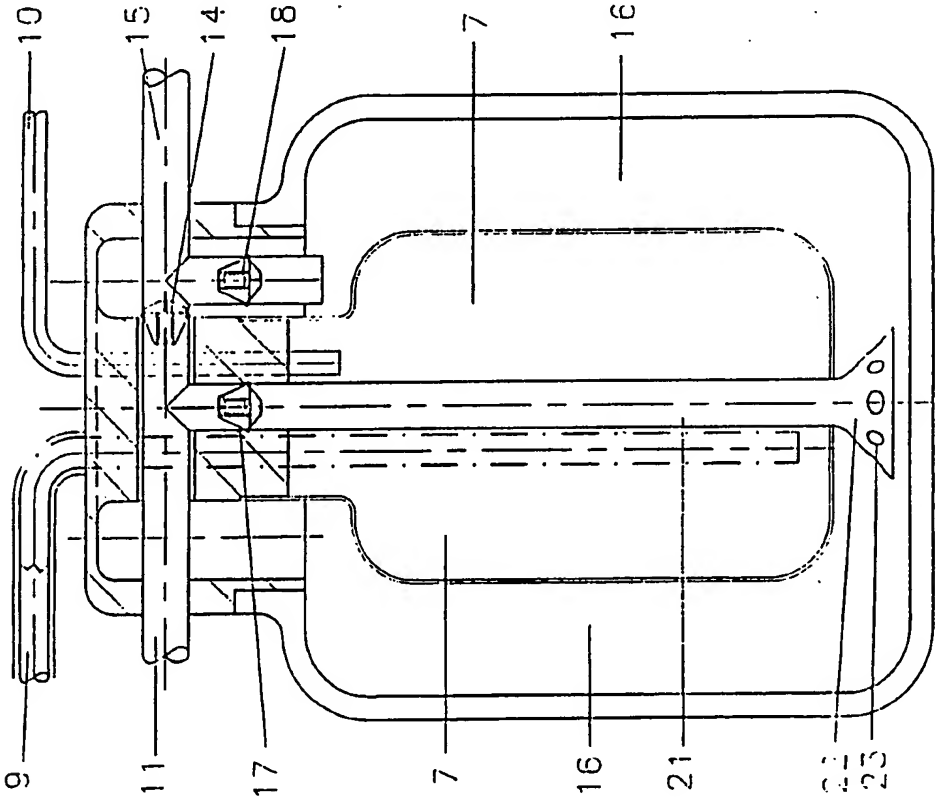


FIG 4

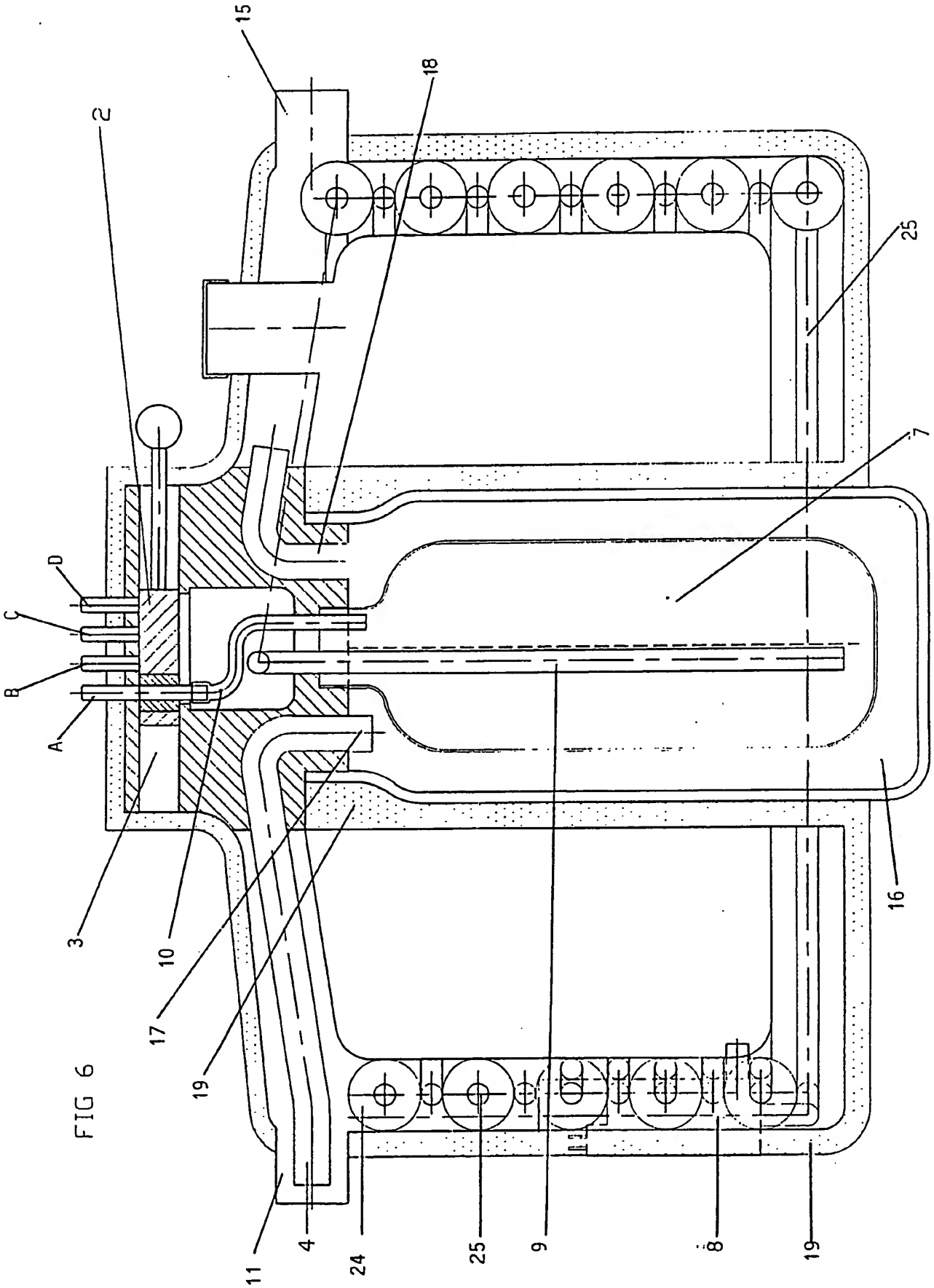


FIG 6

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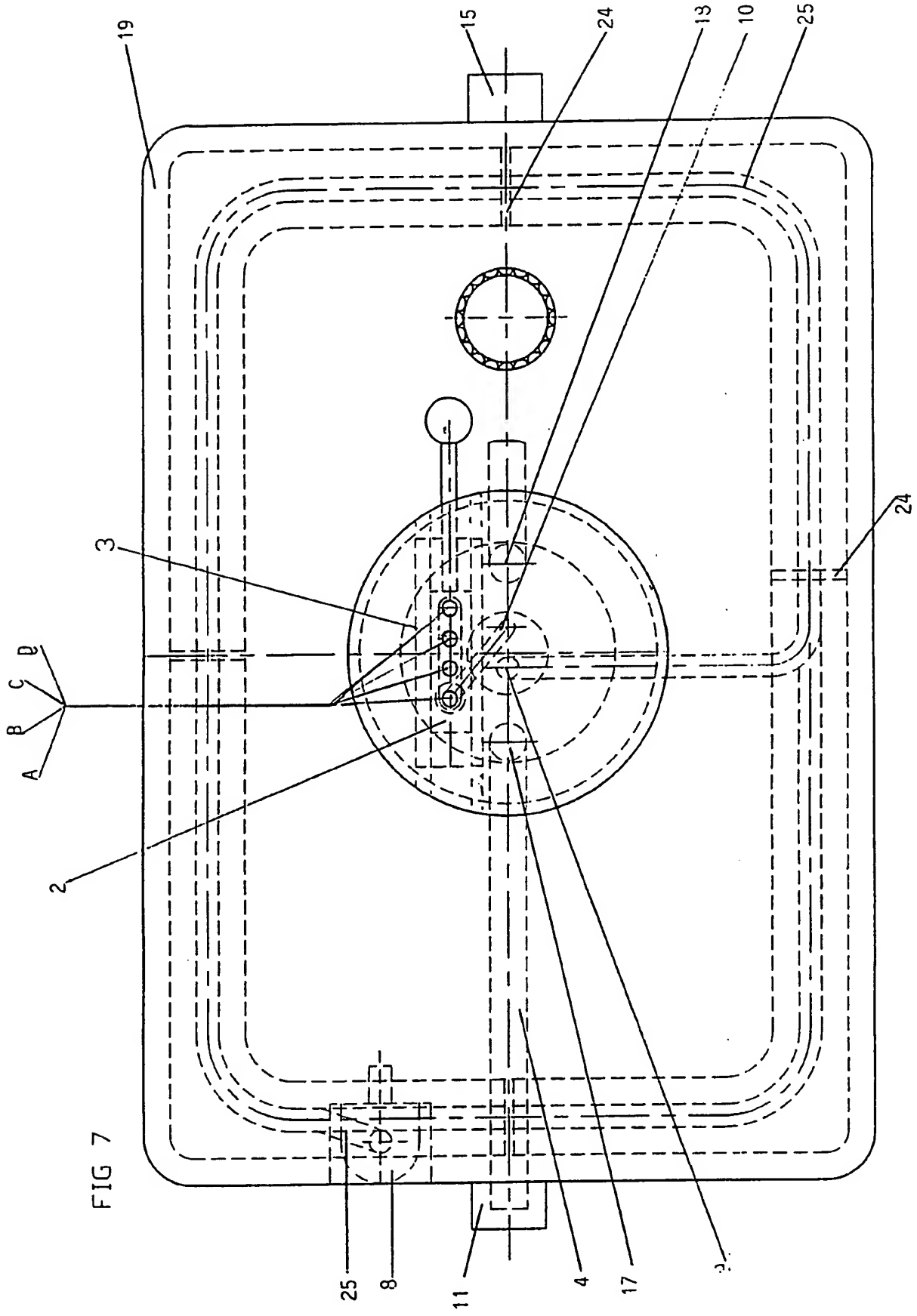

FIG 7

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- SCREEN WASH -

This invention relates to motor vehicle screen wash.

1. Since the advent of motor vehicle windscreen washers, little or nothing has been done to alleviate the nagging problems that have evolved from this legal requirement, icing over of pressure jet nipples, freezing reservoirs and pipes and that dreaded hazard of running out of water on the motorway in the worst of weather conditions.

2. Ofcourse, the addition of antifreeze in the form of screenwash, in a strong enough solution eradicates frozen pipes and reservoirs, however this measure seems to have brought about an even more hazardous condition, Glare ! and early tests seem to bear this out.

3. Since the introduction of these washers, The Ministry Of Transport have decreed, both in 1980 ? and in 1992 that the trajectory of motor vehicle headlights be lowered, in attempting to solve the problem of glare, this ofcourse, was partially sucessful, but glare is still with us and is a serious danger.

4. It is believed that glare is not wholly caused by oncoming headlights,but by windscreens and wiper blades contaminated with the added antifreeze to the screenwash system. It is interesting to note, that for the first few years of bottled screenwash, no mention was ever made of glare, today however, it seems necessary to depict the word"ANTIGLARE" across a third of the bottle surface. This in no way decries the manufacturers of these products, but as long as it is necessary to add antifreeze to these washers, Glare will continue to be a hazard.

5. An added pointer, which may carry some weight, was arrived at, when it was noticed that the worst cases of glare were suffered when the oncoming vehicle was invariably fitted with headlamp wash-wipe. Could the double application be a contributory factor ? A cold screen wash, totally protected from the elements (sub zero temperatures) would be an advantage.

6. However much credence is given to the above, the introduction of more stringent visability regulations (R.T.A. JANUARY 1993) and the expected emphasis on enforcment would make some further advance in this sphere inevitable. A hot screen wash, deriving its energy direct from the cooling system of the water cooled internal combustion engine is proposed and is believed viable.

7. The following hot screen wash will eradicate those forementioned ills and also bring to the motorist some very useful attributes in saving time and frustration, when, at the press of a button, getting clear, all round vision in the worst of winter weather, road grime, industrial & salt spray and will be available in summer for dealing with road film and that menace "INSECTS". Road safety must surely be enhanced by permanent clear vision.

8. This invention will give a constant supply of hot, clean water, free from additives, especially antifreeze, to windscreen, rearscreen, sidescreens mirrors and headlamps, as and when required, throughout the length of any journey, provided the cold water screenwash reservoir is topped up. It will also keep in reserve, a supply of hot water for immediate use on return to a ** vehicle, yes even overnight. This reserve is available even before engine is started and will prove an asset in defrosting windscreen, rearscreen etc. and freeing wiper blades frozen to screen, eliminating damage to same, thereby extending their efficient and useful life.

** insert COLD.

9. The principle of this invention is to convert the present cold screen wash system to hot and to modify same. This is done by transferring, externally the endless supply of energy flowing through the liquid cooling system of the internal combustion engine, prior to it being cooled and to harness that energy outside the hermetically sealed bounds of the cooling system for any purpose whatsoever, in this case HOT SCREEN WASH.

10. According to the present invention there is provided - A Hot Screen Wash expressly designed to function effectively and efficiently at ambient temperatures above and below zero degrees centigrade, totally protected from the elements and free from additives, especially antifreeze and deriving its energy from an existing, hermetically sealed and previously inaccessible, onboard, circulating source of energised liquid by means of an energy transfer unit. This energy transfer unit being specifically designed to intercept, accept, redirect and carry any such liquid flow on its sealed course in a manner as to cause natural, external transferral of its energy by conduction, either inward or outward to the contents of a secondary, sealed and seperate receiver circuit, such secondary circuit being hermetically sealed from its primary,donor,liquid energy source but having external access of entry and exit, thus allowing previous inaccessible energy to be now harnessed and be delivered, in its new form, to any vantage point for practical use. This new energy form may be detectable or undetectable by the human senses but its existance and properties will be verified by scientific process and is available for any single,specified utilisation.

11. As my attempts at technical art may prove difficult enough to understand and the single written word would not adequately describe the various features herein, I have refrained from marking drawings but submit Page 3 of this description as numerical cross reference.

12. A specific embodiment of the invention will now be described by way of example with reference to accompanying drawings and attatched numerical cross reference Page 3 in which.

FIGURE 1. shows in cross section. Cold water reservoir and combined energy transfer unit.

FIGURE 2. shows in cross section. Demountable stopper or head in detail.

FIGURE 3. shows plan of Figure 2.

FIGURE 4. shows in cross section. Energy transfer unit with variation of inner receiver.

FIGURE 5. shows in cross section. Energy transfer unit with further variation of inner receiver.

FIGURE 6. shows in cross section. Alternative method of double walled cold water reservoir with central, integral energy transfer unit.

FIGURE 7. shows plan of Figure 6.

The method of utilising this energy in a Hot Screen Wash system follows on Page 4.

NUMERICAL CROSS REFERENCE

0. Pressure reducing riser pipe.
1. Energy transfer unit.
2. Sliding piston (in mini-manifold).
3. Independent service mini-manifold.
4. Flow carrier pipe (through cavity 5).
5. Cavity of double walled cold water reservoir 6.
6. Single or double walled cold water reservoir.
7. Inner receiver. (in any form).
8. Reversible electric pump.
9. Small bore plastic tubing inlet. (to inner receiver 7).
10. Small bore plastic tubing outlet. (from inner receiver 7).
11. Input connector nozzle.
12. Passing through hot liquid feed pipe element.
13. Through bypass.
14. Through bypass thermostat valve.
15. Output connector nozzle.
16. Vacuum flask cavity.
17. Thermostat valve. (at entrance to vacuum flask cavity).
18. Thermostat valve. (at exit from vacuum flask cavity).
19. High insulation jacket.
20. Original low level sensor. (now integral part of electric pump 8).
21. Central intake pipe. (variation of inner receiver 7).
22. Flared end piece of central intake pipe 21.
23. Ring of depressurising bore holes.
24. Plastic washers. (as spacers).
25. Small bore tubing worm or coil.
26. Demountable stopper or head.

Vacuum flask, complete with inner receiver and demountable stopper or head is referred to throughout as energy transfer unit and is numbered 11.

13. Referring to Figure 1, the cold water reservoir 6 is the source of supply of cold clean water to inner receiver 7. This supply is aided by a reversible electric pump 8 which quickly fills inner receiver 7 via small bore plastic tubing 9 and thereafter, delivers under pressure,a constant supply of water to windscreen etc. via small bore plastic tubing 10 and existing pressure jets.

14. When the liquid cooling system of the internal combustion engine is interupted to accommodate the energy transfer unit 1, the flow enters at input connector nozzle 11 or at connector 12 on reservoirs fitted with passing through hot liquid feed pipe element 12, it then passes through bypass 13 and by pass thermostat valve 14 which is open at low temperature,it then returns, on its original course, via output connector nozzle 15 to system for cooling. On coolant reaching desired temperature, bypass thermostat valve 14 closes, directing hot coolant into vacuum flask cavity 16 via thermostat valve 17 which opens simultaneously with bypass thermostat valve 14 closing. The hot coolant then circulates vacuum flask cavity 16, transferring its energy to the contents of inner receiver 7 before leaving vacuum flask cavity 16 via outlet thermostat valve 18 which opens in conjunction with intake thermostat valve 17 and returns on its original,sealed course via output connector nozzle 15 for cooling. The energy transfer unit 1 effectively becoming an extension of and an integral part of the sealed and pressurised liquid cooling system. There is a delay of two or three degrees centigrade between these valves operating i.e. valves 17 and 18 open slightly before valve 14 closes, this ensures free passage of coolant at all times.

15. This constant circulation of transferrable energy ensures a more than adequate supply of hot water to windscreen, rearscreen and any extended modifications. When engine is switched off and coolant liquid begins to lose temperature, the thermostat valves at flask cavity intake 17 and outlet 18 close, trapping coolant liquid at high temperature in vacuum flask cavity 16. The contents of inner receiver 7, if not already at similar temperature,will now equalise and remain hot for many hours and is available for immediate or later use. When thermostat valves 17 (intake) and 18 (outlet) close, valve 14 is opening, returning cooling system to its original state, thus preventing any interference with other components when starting engine from cold.

16. As all liquid cooling systems of the internal combustion engine work under pressure (up to 15lbs. psi.) very high temperatures can be reached (up to 120°centigrade) and a high percentage of this energy can be transferred to the contents of inner receiver 7, it may be beneficial and/or necessary for the end product of inner receiver 7 to be temperature controlled. This can be achieved by installing substitute electronic valves at vacuum flask cavity 17 (intake) and 18 (outlet). These electronic valves are triggered by a preset temperature sensor (not shown) fitted in inner receiver 7 and also incorporate high insulation seals. To prevent these electronic valves opening when vehicle is parked and coolant temperature falls below their operating temperature, the preset temperature sensor is wired through the ignition switch.

17. It will be evident from the above paragraphs, that if detriment to the liquid cooling system is to be avoided, certain criteria must be maintained e.g. any break into the liquid cooling system to accommodate apparatus of any description, must leave the system hermetically sealed and give free passage to circulating coolant liquid. Therefore any in line apparatus fitted,however remote and distanced from the point of origin of the energising of the liquid it is designed to carry, becomes an extension of and an integral part of the pressurised liquid cooling system and transferral of energy, whether

transferred inward to the contents of a vessel which is immersed in its donor, liquid energy source, (as in Figure 1 transfer from 16 to 7) or transferred outward to the contents of a vessel which encompasses its donor, liquid energy source, (as in Figure 4 transfer from 21 to 7 or again Figure 1 transfer from 12 to 6) is regarded as external transferral of energy.

18. Though the reserve of hot, clean water in inner receiver 7 can be used on immediate return to a cold vehicle, it is beneficial to start engine at once, thus ensuring a constant supply of hot water.

19. To eliminate the necessity of additives, such as antifreeze,in the screen wash system, whether hot or cold, it is necessary to totally protect the cold water reservoir 6 and small bore plastic tubing inlet 9 and outlet 10 in a high insulation jacket 19 and/or aided by the use of a reversible electric pump 8. When operated in reverse of normal use,this reversible electric pump 8 will draw back all excess water lying in small bore plastic tubing 10 to inner receiver 7, where it is reheated, protected and kept hot for further and later use. To ensure that this reverse procedure is not overdone, resulting in more hot water being drawn back from inner receiver 7 to cold water reservoir 6 than is necessary, an electronic sensor (not shown) is fitted in stopper or head 26 where small bore plastic tubing 10 exits from inner receiver 7. This sensor is wired to activate warning light on dashboard when terminals are exposed. To deactivate this sensor and warning light, slight forward pressure from electric pump 8 will cover terminals, satisfying operater that all small bore plastic tubing 10 is now empty, with inner receiver 7 full. It is seen that the electronic sensor installed in inner receiver 7 (paragraph 16 previous page) can be adapted and wired to double for this purpose. To eliminate over loading electric pump 8 when operating in reverse against a full cold water reservoir 6, a bypass riser 0 of small bore plastic tubing is fitted from pump 8 up to top of cold water reservoir 6. This will allow water drawn back to take the line of least resistance on entering cold water reservoir 6.

20. To keep heat loss to a minimum, non return valves are fitted to all pressure jets. (not shown). This effectively creates a vacuum in all small bore tubing 10 when water is drawn back to inner receiver 7. The resulting collapse of small bore plastic tubing 10's walls is not found to be detrimental, because of the nature of their material construction and hot water flows freely, on again being pressurised. In order for this procedure to be effective, it is advised to be carried out some ten minutes before parking up for the night or for extended parking periods in sub zero temperatures.

21. The reversible electric pump 8 is fitted with a specially designed and adapted auger type water vane in order for it to pump in opposing directions and is operated by a secondary switch position on the normal steering column lever switch. The means by which this electric pump 8 is reversed is by the addition of an extra pair of terminals on pump body and when wired in opposition to that of original terminals and operated by a seperate switch, will give the desired result.

22. Pressure of delivery is regulated up or down by the variation of electric pump 8's capacity and is aided upwards by using larger, inside diameter small bore plastic tubing at inner receiver inlet 9 than at outlet 10. Choice of size and shape of pressure jet is optional to suit individual task.

23. Frost protection is varied to suit conditions prevailing and in climes where sub zero temperatures of -10 degrees centigrade and below are normal, an extra protection is provided. This takes the form of a hot liquid element 12, shaped from the alternative feed pipe 12 passing through the cold water reservoir 6, this aid will initially warm up and eventually bring the cold water in reservoir 6 to a fairly high temperature and when required will give a quicker turnover through inner receiver 7 in heavy use situations. The triple protection of insulation jacket, empty tubing and created vacuum in all small bore plastic tubing 10 is not necessary in most situations, the choice adopted will be relative to need,but if the reversible electric pump 8 is discarded, the initial, minimal quantity of water from a service that has not been used in some time,could well be cold. In the above, the cold water reservoir 6 becomes an outer receiver, the hot liquid element 12 carrying its donor liquid energy source. (outward transferral)

24. A low water level sensor (originally 20) is fitted in cold water reservoir 6. This sensor (not now shown) becomes an integral part of reversible electric pump 8 and is activated when terminals are exposed, signifying on dashboard warning light that cold water reservoir 6 is empty. At this stage, reversible electric pump 8 will still pressurise inner receiver 7 by air pressure, giving an emergency supply of hot water, equal to approximately twenty miles travel, at medium to heavy use. Early top up is advised and reliance on emergency supply is to be avoided. It is also found that the capacity of most present, cold water reservoirs should be increased by at least fifty percent.

25. An alternative method of heating screen wash water is by the use of an electric element installed in any vessel (where practical) designed to store such water. This is effective but can prove a drain on an electric system system that is less than one hundred percent efficient.

26. A useful extension to present screen wash systems, is the fitting of pressure jets, complete with small bore plastic tubing, to vehicle door mirrors. These pressure jets will adequately clear frosted mirrors and side windows and are fitted to mirrors operated manually, mechanically or electrically. There is also provision made to accommodate headlamp wash-wipe.

27. Though FIGURE 1 shows cold water reservoir 6 and energy transfer unit 1 combined, this is not necessary. Though it is preferable that they be mounted close together and as near as possible to the source of supply of hot coolant liquid, they can, where space or the lack of it dictates, be mounted seperately, at any distance, provided that small bore plastic tubing, inlet 9 is fully protected from frost throughout its length. Also if passing through hot liquid element 12 is adopted, this too would need to be extended.

28. A simpler but restricted method of acquiring hot water to windscreen and associated points, is achieved by fitting nipples to accommodate small bore plastic tubing to expansion tank or extra tank fitted to cooling system prior to cooling. These nipples are in two parts, a male and a female and are fitted inside and outside of tank, ensuring a water tight seal.A length of small bore plastic or metal tubing, of thin walled quality,is now inserted in tank, coiled as in FIGURE 5 with both ends fitted to nipples on inside of tank. Two lengths of small bore plastic tubing, (normal quality) are now fitted, one to first nipple on outside of tank, with other end fitted to electric pump 8 at cold water reservoir 6. The second length of small bore plastic tubing is now fitted to second nipple on outside of tank, with other end fitted to tee piece before pressure jets at windscreen.

Plastic washers 24 Figure 5, as spacers are threaded on to small bore worm or coil in tank to ensure circulation. This method, if used in expansion tank has no detrimental effect on the cooling system and is effective, giving hot water as long as cooling system is at normal running temperature, but can not supply hot water from a cold system, when ofcourse, it is most required. In this example expansion tank or extra tank fitted becomes energy transfer unit and small bore worm or coil 25 becomes inner receiver 7.

29. A complete modification, giving a constant, more than adequate and ever available supply of hot, clean water,free from additives especially antifreeze returning to glass its primary quality, visability and in this case surely enhancing safety.

30. It is conceivable that such a source of energy, freely available and harnessed in such a manner would arouse the mind of the discerning technician, possibly to the extent of more importance being attatched to the method by which this energy is harnessed than the purpose for which it is being used in this invention. It is forseen that the transfer of this energy may be engineered by designing future liquid cooled power units to accommodate within their liquid cooling systems, such means as described herein or parts thereof for this purpose. The insertion of any form of inner receiver in radiator, cylinder head, cylinder block or any connecting part of the sealed liquid cooling system will suffice for this purpose, it is therefore thought necessary to describe in some detail the design, construction and function of energy transfer unit 1.

31. The energy transfer unit 1 comprises a specially designed outer vacuum flask, adapted to accommodate and encompass an inner receiver 7, both seperately and hermetically sealed and distanced from each other by a suitable cavity 16 and their intimate but seperate connection with a purpose designed stopper or head 26, serving as the sealing,vacumised stopper of both flask and inner receiver 7 . The vacuum flask is of robust construction and is adequately protected from damage, both before fitting and when installed, it has equal to or above average ability to store, preserve and protect energised liquid and is designed to interupt, intercept accept at input connector nozzle 11 any flow of circulating energised liquid,redirect it by thermostat 17 via vacuum flask cavity 16 and then return same to its original course via thermostat valve 18 and output connector nozzle 15, the contents of inner receiver 7 being energised by its passing. This constant and endless passage of energised coolant liquid and its natural, external transferral of energy to a specific secondary substance for a stated purpose is regarded as a single utilisation.

32. The inner receiver 7 can be constructed of any material e.g. plastic, rubber, fibre, glass, metal or any natural or man made material found suitable for its intended task, remembering its conductive role and its pressurised position. It can take the form of a bottle as in (FIGURE 1) a flexible bag as in (FIGURE 4) or an endless worm or coil as in (FIGURE 5) or any such design that proves effective for its particular function,in fact the only essential criteria of the inner receiver 7 is that it be hermetically sealed from its donor energy source and have external access of entry and exit.The inner receiver 7 can be installed as a sub divided recepticle, each compartment having access of entry and exit, giving it multi purpose ability to energise various substances. such multi purpose use would be regarded as repetetive utilisation.

33. Again the inner receiver 7 can be installed as a pressure tested vessel, capable of energising any known substance, within the bounds of practical reason and safety regulations and storing, preserving and protecting any form of matter arising from the energising of any such substance. It is then designed to safely deliver any such matter, via metal tubing or pipes of chosen dimension to any vantage point for immediate or subsequent practical use. The matter arising from such energising can come in many guises, e.g. visable or invisable, tangible or intangible, odourous or odourless, flavoured or flavourless or audible or inaudible, or may only be detected by scientific process and is delivered by gravity, under pressure or by its own volition.

34. This transfer of energy can be achieved by reversing the process, i.e. instead of transferring energy to a vessel that contains the recipient substance and is encompassed by its donor, liquid, energy source, the transfer is made from the donor, liquid, energy source being passed through the vessel containing the recipient substance, as in FIGURE 1 12. (outward transferral). If any external connecting part of the cooling system is replaced by a high conductor vessel, fitted flexibly, and this vessel was then encompassed by an outer vessel (of chosen dimension) Hermetically sealed at the extremities of its inner conductor and having access of entry and exit, it would then serve as an outer receiver.

35. With the exception of worm or coil 25 FIGURE 5 (variation of inner receiver 7) the entry delivery to vacuum flask cavity 16 can pass through the centre of any chosen form of inner receiver 7, as in FIGURE 4, thus transferring energy from centre outwards as well as external circulation doing likewise in reverse. This central delivery pipe 21 has a flared end piece 22 which incorporates a ring of bore holes 23 effectively reducing pressure and giving equal circulation and even distribution of transferrable energy. In this case inward energy transfer and outward energy transfer are seen in the one example.

36. Also with the exception of endless worm or coil 25 FIGURE 5, the inner receiver 7 has provision for external entry and exit of optional dimensions and material construction to safely accept and deliver such matter as will suffice for the intended task. In the case of Hot Screen wash provision is made to accommodate small bore plastic tubing, inlet 9 and outlet 10.

37. The demountable stopper or head 26 is constructed of a high insulation material and is so designed, once fitted, to allow free flow of any circulating liquid and at optimum moment, accept, obstruct and redirect any such energised liquid flow by thermostatic control to vacuum flask cavity 16 and then as earlier described. Thermostat valves 17 (intake) and 18 (outlet) act in opposition to that of thermostat valve 14 i.e. opening when it closes and vice versa. These thermostat valves are fitted with high insulation seals to minimise heat loss and the demountable stopper or head 26 (where appropriate is vacuumised to assist in same.

38. There is a natural procees in all sealed and pressurised liquid cooling systems of the internal combustion engine that can be utilised beneficially. This refers to the quantity of coolant liquid regurgitated back to the expansion tank when the coolant heats up and expands, if the expansion tank or hose is fitted with a valve in order to prevent the return of this quantity of coolant liquid to the system when the system cools down and the volume of coolant decreases, it will effectively create a vacuum at the highest point in the cooling system.

The valve herein mentioned, will be electronically operated and is wired through the ignition switch so as to close when ignition is switched off and open when switched on again, thereby allowing trapped coolant liquid to return to the system on a cold start up. If found beneficial this natural vacuum can be exaggerated by the use of a reversible electric pump (as in 8) at expansion tank, activated by temperature sensor and cut out by relay.

39. As the methods of achieving the desired end product are many and varied, it is thought prudent to describe at least one alternative, updated example,using Drawing 5/4 and 5/5 FIGURES 6 and 7 as reference. To avoid confusion, numerical reference remains the same as in prior documents and numbers from five downwards (not previously used) are now used to indicate any new features.

40. In this example,the cooling system is interupted at a different point, where space in most vehicles is, or can be made available with the least interuption. The method does not deviate from the principles of original idea and, where necessary, desirable and applicable, uses all the features in prior documents. This method introduces the cold water reservoir 6 as a double walled reservoir, which, in fact, becomes an energy transfer unit itself,but retains the original energy transfer unit 1 as a central integral part.

41. The now, double walled cold water reservoir 6,is totally protected by an insulation jacket 19 and is directly connected to the cooling system at a point, where the coolant is already temperature controlled and its volume is increased by approximately five fold, this allows for a more efficent, simpler and possibly more commercially economic Hot Screen Wash System. Connector nozzle 11 (input) and connector nozzle 15 (output) of original energy transfer unit 1, now serve same purpose on double walled cold water reservoir 6. The cavity of this double walled cold water reservoir 6 is indicated by the number 5.

42. As the volume of flow at this point is increased by approximately five fold, the entry at input connector nozzle 11 is sub divided, the smaller, central orifice, being the acceptance end of carrier pipe 4, carries a similar volume of coolant (as in original energy transfer unit 1) at its highest temperature, direct to vacuum flask cavity 16 of centrally incorporated energy transfer unit 1. The balance of this increased flow is accepted by the larger, outer orifice of input connector nozzle 11 into cavity 5 of double walled cold water reservoir 6, where it circulates cavity 5, transferring its energy to the clean, cold contents of, what now becomes the inner cold water reserver 6, which now becomes a receiver.

43. The constant flow of hot, protected coolant through cavity 5 of double walled cold water reservoir 6 forms a permanent protection barrier for the contents of inner cold water reservoir 6 (now hot) while transferring energy by its passing. This constant transfer of energy and protection makes previous hot liquid element 12 redundant.

44. In original description, bypass 13 and its inbuilt thermostat valve 14 were necessary to protect the efficient working of an in line component and to prevent the reverse transfer of energy from inner receiver 7 to vacuum flask cavity 16 on a cold start up. In this example, as there is no other component before cooling and the coolant is already temperature controlled, by pass 13 and its inbuilt thermostat valve 14 now become redundant. The existing thermostat valve, housed at this point would be upgraded with a high insulation seal.

45. It is now seen that the insulation jacket 19 on the double walled cold water reservoir 6, serves to conserve energy rather than to protect end product from frost. This insulation jacket 19 being efficient and working in conjunction with the natural vacuum described at (paragraph 38 Page 8) it is now possible to have a Hot Screen Wash System without the necessity for thermostat valves 17 (intake) and 18 (output), if however, temperature control of end product of inner receiver 7 is desirable, electronic valves, as described at (paragraph 16 Page 4) can be substituted, in fact all that is required to control the flow through vacuum flask cavity 16 and therefore the temperature of contents of inner receiver 7 is one such electronic valve at flask cavity intake 17. When electronic valve at flask cavity intake 17 is closed, larger orifice at input connector nozzle 11 is capable of accepting full volume through cavity 5, any increase in pressure at input connector 11 is minimal and is acceptable.

46. From the previous paragraphs it will be seen that we now have two energy transfer units on line, the inner receiver 7 in vacuum flask being supplied with already heated clean water from inner cold water reservoir 6 via small bore worm or coil 25 situated in cavity 5, itself receiving energy from hot coolant in cavity 5. This combination, in most cases is not necessary e.g. vehicles that regularly travel ten miles or more before being parked up for an extended period can service a hot screen wash without the need for inner receiver 7 in vacuum flask, the vacuum flask in this case would become the ultimate receiver and protective store for screen wash hot clean water and would be serviced only by small bore tubing inlet 9 and outlet 10, with independent service manifold 3 being utilised on line.

47. The independent service manifold 3 is situated in stopper or head 26 and serves four seperate deliveries. Delivery small bore tubing 10 is bisected by sliding piston 2 in manifold cylinder. The short piece of small bore tubing 10 from inner receiver 7 is sealed to sliding piston 2 at vertical bore hole and travels with piston 2,it is offset for this purpose and because of its flexible nature (made more so by the temperature of its contents) any slight distortion does not affect the volume of its inside bore diameter. Two rubber, grommet type seals are fitted on sliding piston 2 (one on either side of vertical bore) to ensure pressure and a spring loaded internal collar (not shown) is fitted in top of vertical bore hole to locate any one of service nipples A.B.C.or D Sliding piston 2 is keyed to manifold cylinder 3 (remote from grommet seals) to ensure it holds its line.

48. The original demountable stopper or head 26 now becomes an integral part of manufactured, double walled cold water reservoir 6 and the vacuum flask with inner receiver 7 (energy transfer unit 1) is removable from same.

49. Reversible electric pump 8 is fitted in a recess of outer wall of double walled cold water reservoir 6 and though seperate from, is circumvented by the hot coolant in cavity 5. The reversible electric pump 8 draws clean water (now hot) from inner cold water reservoir 6 and pumps same at an angle of 90° back into cavity 5 via small bore plastic tubing which is coiled (as in 25 Figure 5) throughout cavity 5, reaching its entry to inner receiver 7 between intake 17 and outlet 18 without ever being exposed to the elements. This worm or coil 25 of small bore plastic tubing may continue as inner receiver 7 inside vacuum flask and emerge as delivery small bore tubing 10 or feed any chosen form of inner receiver 7, when it would then revert back to its original description inlet 9. The small bore plastic tubing worm or coil 25 can come as a manufactured part of double walled cold water reservoir 6 and can, if desired, be substituted by a high conductor metal coil.

50. If the set up of double walled cold water reservoir 6 with vacuum flask as a central integral part or (situated on line) minus inner receiver 7, the temperature of end product wil be the same at both stages,this will eliminate the necessity for warning sensor when operating reverse electric pump 8 as no harm can result from over indulgence and operator, through familiarity will soon guage correct usage.If this option is adopted the preset temperature sensor is installed in vacuum flask.

51. Referring to Drawings 5/4 and 5/5 FIGURES 6 and 7 - when the double walled cold water reservoir 6,with its central integral energy transfer unit,is installed and connected to interupt and accept the flow of the liquid cooling system of the internal combustion engine, the flow enters, already temperature controlled, at input connector nozzle 11,where it is immediately sub divided, the lesser volume being accepted by the smaller, central orifice,which is the acceptance end of carrier pipe 4 which carries this volume of coolant, at its highest temperature, direct to vacuum flask cavity 16 via intake valve 17, it circulates vacuum flask cavity 16, transferring energy to the contents of inner receiver 7 before leaving cavity 16 via outlet 18 and connector nozzle 15 and then to cooling. The greater volume flow is accepted by the larger outer orifice of input connector nozzle 11 into cavity 5 of double walled cold water reservoir 6, where by passing through , it transfers its energy to the clean, cold water of inner cold water reservoir 6 before leaving cavity 5, via output connector nozzle 15 and to cooling, This constant circulation of energised and protected liquid coolant through cavity 5, forms a permanent, protective barrier from the elements for the contents of inner cold water reservoir 6. The electric pump 8, supplies, under pressure,clean(now hot) water from inner cold water reservoir 6 via small bore worm or coil 25, through cavity 5, to inner receiver 7 and then, still under pressure, to chosen sevice through independent service manifold 3 and any one of service nipples A, B, C, or d to pressure jets via small bore plastic tubing 10.

52. Though the energy transfer unit 1, in service, is a sealed unit,provision is made for access to vacuum flask cavity 16 and inner receiver 7 (if applicable) via the seperation of vacuum flask from stopper or head 26, The dimensions, capacities, volumes, pressures, design and material construction of the energy transfer unit 1 are totally flexible and optional, enabling it to be accommodated in an area of little more than its own mass and can be fitted easily and speedily at any convenient point (taking note of height) in or on the chasis, boot, engine or passenger compartment of a wheeled,motor vehicle,a static internal combustion engine or any industrial or domestic situation.

53. It must be stressed that it is the intention to harness this energy for practical use, though this method can equally assist in the cooling of an unwanted energy, in fact,exploited to its maximum, the transfer of this energy could replace the present means of disipating this energy by radiation, The transfer of energy would have to be constant and disipate the energy between the temperature of coolant leaving its engine cooling jacket and the recomended temperature of its return after cooling.The present radiator would work in conjunction by thermostatic control of the flow volume returning to maintain this temperature balance and the harnessed energy would at least partially power the unit that created it. As road salt is one of the principle offenders to drivers visability, transfer of energy, either to or from any saline solution such as sea water is excluded from the terms of this specification

54. Transfer of energy from the cooling system of the internal combustion engine, on the scale of and by the method herein described, for the purposes of a hot screen wash, has no detrimental effect on most vehicles, however, if the scale of energy transfer was greatly increased, the normal running temperature would be affected. Correction is acheived by alteration of temperature control and/or increase of volume throughput of radiator.

55. The principle of this invention is effective, efficient and is compatible with any form of liquid cooled power unit whether mobile or static, or any industrial or domestic situation where a flow of energised liquid, pressurised, pumped or gravity fed is in existance, its limitations being restricted only by the maximum normal running temperature of the system to which it is tapped, the ingenuity of man and the laws of physics.

56. The initial transfer of energy from the existing, energised, liquid, donor source to any single substance for a specific purpose, is regarded as a one of utilisation of external transferral. If the substance energised by the initial transferral or part thereof, is not, itself, put to a single practical use, but is utilised as a secondary donor circuit, thereby allowing further single or multiple use, this would be regarded as manipulative reverse engineering and the following paragraph is inserted to avert such a possibility

57. Any utilisation of energy which was acquired by the initial external transferral from the existing, resident, energised, liquid, donor source, including any apparatus fitted for the purpose of this energy aquisition in a manner as herein described, however often transferred and remote from the origins of its energising, for a one of, specified purpose, is deemed to be a single utilisation.

58. For the purpose of establishing intent, the following will explicitly apply in relation to this specification.

Definition

EXTERNAL TRANSFERRAL OF ENERGY MEANS - Releasing, by conductive transfer, an existing energy from its liquid donor source, which by its very nature and function, is, by necessity, confined by hermetically sealed bounderies, through a single conductor agent.

INWARD TRANSFERRAL OF ENERGY MEANS - Transferral of energy from its liquid, donor source, to the contents of a vessel, which is immersed in and encompassed by its donor energy source.

OUTWARD TRANSFERRAL OF ENERGY MEANS - Transferral of energy from its liquid donor source to the contents of a vessel which encompasses its donor energy source.

59. As in all commerce, should any interest be shown in this idea, choice according to need will determine the final outcome and any combination, permutation or division of the features herein described may be the result.

60. In the event of some form of protection being subsequently granted it is hoped that the idea of harnessing this energy from the liquid cooled power unit of a land going vehicle, as herein described, as well as the means to utilise such energy for practical industrial use will be given consideration.

61. Intermittent windscreen wipe has been a valuable feature of visability in motoring for many years, so much so,that its, value is only appreciated when it is absent. Even so, the very conditions that prompts the motorist to activate the intermittent wipe are so uncertain that the result is either the intermittent rain drops become a downpour or they become almost non existant. The former is not a problem but the latter is a long standing malady. It is only when the wiper blades begin their arc that it is realised the windscreen is too dry or soiled with industrial deposits, road grime etc. remedial action comes, by activating screenwash, often too late as one arc of the wiper blades oblitirates wind screen or momentarilly, greatly diminishes visability, if suffered in the hours of darkness this condition and its obvious danger can be well attested to by experienced and well traveled motorists. the solution to the above is a combined intermittent wash-wipe, it is achieved by carrying the intermittent power supply from the wipers to the electric screenwash pump at screenwash reservoir. Ofcourse if the power supply to the electric pump was of the same duration as that of the intermittent power supply to the wipers this would result in electric pump spraying water on windscreen after wiper blades had passed on its return arc to rest, this defeats the purpose, the intermittent power supply to the screenwash electric pump is limited to 70°/₀ in relative duration to that of power supply to wiper blades. This ensures that wiper blades, on their return arc, cleans all surplus water from windscreen before coming to rest. The target position for pressure jet water on screen is easily adjusted to achieve above. The time is long past for motorists to give as much attention to the screenwash water level as they do to their fuel guage and the time has come for manufacturers to supply screenwash reservoirs of adequate capacity.

- CLAIMS -

1. A screenwash system wherein all parts, which at present leave screenwash water exposed to and vulnerable at sub zero degrees centigrade, necessitating the addition of antifreeze, are totally protected from the elements by at least one, a combination of or all of the following methods. Insulation, Vacuumisation, Energising, Retraction of exposed water to a protective vessel or by screenwash water reservoir being immersed in or encompassed by the the protected coolant liquid of internal combustion engine of a motor vehicle.

2. A screenwash system as claimed in claim 1 wherein such a system operates efficiently with the total exclusion of any form of antifreeze.

3. A screenwash system as claimed in claim 1 or claim 2 wherein a low water level sensor is installed in the screenwash water reservoir, so situated, as when top up is due, will be exposed and send signal to motorist by way of flashing warning.

4. A screenwash system as claimed in claim 1 claim 2 or claim 3 wherein an intermittent wash is incorporated, to be activated, coincidal with intermittent wipe and deactivated just before wiper blade reaches target spot of screen-wash water on windscreen on return arc, to rest.

5. A screenwash system as claimed in claim 2 claim 3 or claim 4 wherein pressure jets, complete with connecting small bore plastic tubing are installed in fitted door mirrors, giving the ability to clear frosted mirrors and also sidescreens by directional manipulation of door mirrors.

6. A screenwash system as claimed in claim 3 claim 4 or claim 5 wherein a reversible electric pump is incorporated, adapted so as to pressurise liquid in opposing directions and being reversed by cross polarisation.

7. A screenwash system as claimed in any previous claim wherein the screen-wash water is energised by direct conductive transfer of energy from the energised, liquid cooling system of the internal combustion engine of a motor vehicle via an Energy Transfer Unit.

8. A screenwash system as claimed in claim 7 wherein the transfer of energy is by way of a single conductor element or agent and this process is repetetive on line.

9. A screenwash system as claimed in claim 7 or claim 8 wherein at least one thermostat incorporating a high insulation seal to preserve energy, is installed.

10. A screenwash system as claimed in claim 7 claim 8 or claim 9 wherein at least one thermostat operates in reverse of normal i.e. open at low temperature and closed at high temperature.

11. A screenwash system as claimed in claim 8 claim 9 or claim 10 wherein screenwash water is temperature controlled by installing at least one electronic, preset temperature valve which controls throughput of hot coolant liquid.

12. A screenwash system as claimed in claim 9 claim 10 or claim 11 wherein screenwash water is distributed to allocated service via a variable service manifold by aligning outlet feed to chosen service nipple,

13. A screenwash system as claimed in any previous claim wherein screenwash water is energised by installing an electric element in screen water reservoir.

14 A screenwash system substantially as described herein with reference to Figures 1 - 7 of accompanying drawings.

- CLAIMS -

An Energy Transfer Unit as referred to in claim 7 wherein the hermetically sealed, pressurised and energised liquid cooling system of the internal combustion engine is tapped in order to intercept, accept, redirect and carry its liquid flow on its sealed course in a manner as to cause natural, external transferral of its energy, by conduction, either inwards or outwards to the contents of a secondary, hermetically sealed and seperate receiver circuit, such secondary circuit being hermetically sealed from its primary, donor, liquid energy source but having external access of entry and exit, thus allowing previous, inaccessible energy to be now harnessed and be delivered, in its new form to any vantage point for practical use. This new energy form may be detectable or undetectable by the human senses but its existance and properties will be verified by scientific process and is available for any single specified utilisation

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)	Application number GB 9320788.4
Relevant Technical Fields (i) UK Cl (Ed.L) A4F (FAA, FAK, FAL, FAMA, FAMC, FAMD) (ii) Int Cl (Ed.5) B60R 1/06; B60S: 1/48, 1/50	Search Examiner A C HOWARD Date of completion of Search 5 November 1993
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X,Y	GB 1451666	(ASSOCIATED ENGINEERING) - see page 2 lines 11-87	1 at least
X,Y	EP 0456934 A1	(ABE) - see column 2 line 21-column 3 line 32	1 at least
Y	EP 0448487 A1	(TRANSPAR) - see column 1 lines 26-37	3
X,Y	WO 88/03488 A1	(SWF) - see the Abstract	1 at least
Y	US 4763381	(WILLIAMS) - see column 2 lines 38-44	5
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